BRITISH LIZARDS.[1]

WE are glad to welcome this companion volume to the author's excellent work on British snakes, for with the two together the amateur naturalist will learn practically all that he wants to know with regard to the reptiles of our islands. Not that these works are by any means exclusively for amateur naturalists, as there is much matter in both which cannot fail to interest their professional brethren. If Dr. Leighton can be induced to treat the amphibians in a similar manner, we shall have a complete account of the life-history of all the British terrestrial cold-blooded vertebrates.

The author's mode of procedure is very thorough. After giving the leading characteristics of lizards in general, he describes in some detail their anatomy, and then proceeds to deal, *seriatim*, with the five British representatives of the group. The external features of each are illustrated by reproductions from photographs, of the excellence of which our readers have an opportunity of judging for themselves from the accompanying specimen.

Photograph by Douglas English, Dartford.

FIG. 1.—Female of the Common Viviparous Lizard. (From Leighton's "Life-History of British Lizards.")

It is a common belief that reptiles are totally wanting in Ireland; this, however, Dr. Leighton shows to be an error, as the common viviparous lizard occurs in that island, where, however, it is the sole representative of its order. How it got there, to the exclusion of its brethren, he attempts to show. In the later chapters of the book the author has gone very carefully into the local distribution of lizards in our islands, with results of considerable interest; and in order that readers may record new observations for themselves a few tabulated blank pages are appended. Horticulturists should pay special attention to the author's statements as to the great value of the slow-worm as a slug-exterminator. The enlarged diagrams of the "squamation" of the head afford an easy and exact method of identifying the British species of lizards.

Special interest attaches to Dr. Leighton's investigations with regard to the phenomenon of tail-fracture in lizards. It is pointed out that such lines of fracture occur at regular intervals of two scales' length, such spaces coinciding with the lengths of the caudal muscle; and the author is of opinion that the superficial structures have much more to do with determining the fracture than have the septa in the caudal vertebræ.

Concise, exact, and at the same time interesting is our verdict with regard to this admirable little volume.

R. L.

[1] "The Life-History of British Lizards, and their Local Distribution in the British Islands." By G. R. Leighton. Pp. xiv+214; plates. (Edinburgh: G. A. Morton, 1903.) Price 5s. net.

THE EDUCATION OF JAPANESE NAVAL OFFICERS.

ON reference to the second article on "Science in the Navy," published in NATURE of last year, it will be found that the gist of that article was the condemnation of the over-specialisation of officers, accompanied by remarks in favour of the interchangeability of their duties, the practice of the German Navy being brought forward as an existing evidence in support of such views.

Increased support of these views will be found in a valuable lecture which was recently delivered by Lieut.-Commander K. Sato, of the Imperial Japanese Navy, at the Royal United Service Institution, on "The Education of Japanese Naval Officers of the Executive Branch," in which that officer shows that the "Eastern nation," thought at one time to be "too bookish," is by its methods of education making its naval officers eminently practical men with a good grounding of general and scientific knowledge.

The lecturer admitted that his country had fairly followed Great Britain's footsteps in this important matter of education, and had duly profited by the instruction of her officers, but modestly hinted that perhaps in one or two small particulars they had gone "one better" than we had. Here it is encouraging to note that the gallant chairman, with his life-long education in the traditions of our long established Navy, said that there were many things this country could learn from the Japanese Navy—encouraging because we believe that this power to see good in others where it really exists and determination to profit by the same is a ruling spirit amongst our officers.

Whilst giving due encouragement to the specialist officer, it is the constant effort of the Japanese to produce *all round officers* which is so striking, and one would think they had adopted the following as their maxim:—"Inadvertence is no excuse for the non-performance of any duty, for, it is the duty of an officer to make himself acquainted with the detail of every duty he may be called upon to perform."

This is a high standard, and not many fully attain thereto, but it will hardly be denied that it should be the aim of every officer, whilst those who regulate education should do all in their power to keep the road open with efficient aids by the way. Interchangeability is a very promising road to such a goal.

Another point which this lecture brings out clearly

is the training of the specialist officer in the Japanese Navy. He is encouraged to specialise according to the bent of his mind, whether in gunnery, torpedo or navigation, but apart from the special course in those subjects which he has to go through, each officer has to take up several other subjects not immediately bearing upon the one in which he is to be strongest. Here again are points to be studied and thought over, for it is certain that until very recently our specialist officers have been kept too much in a groove. The gunner has "stuck to his linstock," the "timonnier to his helm," and though either might easily be called to do the other's duty, they have seldom if ever changed duties and thus obtained experience.

As rewards to specialist officers, the Japanese give the more important positions and earlier promotion, but no extra pay. We give extra pay but no earlier promotion; nevertheless, their expert knowledge bears fruit when selections are made for certain higher posts of the service.

With the personnel at our disposal, and a naval administration which does not hesitate to throw down the barriers of prejudice standing in the way of sound progress, may we not look to doing "one better" than any competitor in the naval world? The answer is, Yes, if the voice of science is clearly heard in its proper place.

THE NATIONAL PHYSICAL LABORATORY.

THE report of the National Physical Laboratory for the year 1903, which was submitted to the Board last Friday, is the first report covering a full year's working, and shows that very satisfactory progress is being made. It is clear, however, that on the financial side the laboratory is in need of further support, even if it is only to continue to work as at present, whereas it is eminently desirable that the work should be widely extended so that the laboratory can undertake to carry out a number of tests for which there is a demand, and which it is now obliged to refuse. These will in many cases necessitate a considerable increase in the equipment, which is at present very inadequate in many branches, and naturally also an increase in the annual expenditure, which will be only partially recouped by the fees derived from the tests carried out. It is also pointed out in the report that the staff is not large enough, and that the income should be sufficient to allow of higher salaries being paid to the assistants, as those which are at present paid are not liberal enough to secure the permanence of the services of men of the necessary ability.

The net result of last year's working was a loss of a little more than 100*l*., the receipts being, in round figures, 10,200*l*., and the expenditure 10,306*l*. The president and council of the Royal Society have been in communication with the Treasury, and it has been arranged that the grant of 4000*l*. shall be continued for another year (until April, 1905), and also that a scheme for the future working shall be drawn up by the executive committee for the consideration of the Treasury. It is earnestly to be hoped that satisfactory arrangements will be made, and that the very valuable work which the laboratory can perform in the future will not be crippled for want of funds. It is interesting to compare the Government grants to similar institutions abroad which are stated in the report. The Reichsanstalt alone enjoys a grant of 16,000*l*., the total grant to the various departments at Charlottenburg doing the same work as the National Physical Laboratory being 40,000*l*. In America the grant to the Standards Bureau is 19,000*l*., and in France the Laboratoire d'Essais had a grant of 5500*l*. for its first year's working.

If we turn, however, from these financial considerations to the technical parts of the report, we find nothing to cause dissatisfaction, but, on the contrary, a record of very valuable work accomplished. The laboratory has a double function to perform; it has to carry out tests, measurements and standardisations for the public, and it has also to undertake research work, often of a very difficult character, in connection with these measurements. Many of the tests which the laboratory is asked to make are, as a matter of fact, researches in themselves; some of these are quoted in the report, and we may mention, as an example, a series of comparative tests on the materials used for lagging steam pipes. But apart from these there is a vast amount of experimental work to be done in connection with the fixing and reproduction of primary standards of all sorts, and it is very gratifying to see that attention is being given to these questions in a manner which gives promise of excellent results in the near future. We cannot refer to all the work of this kind which has been undertaken at the laboratory but may mention a few typical examples.

Experiments have been carried out on the mercury standard of electrical resistance, eleven resistance tubes having been constructed by Mr. Smith. The results of the measurements made with these tubes show that they agree among themselves to about 3 parts in 100,000, and that the final result agrees with that of the Reichsanstalt to about 1 part in 100,000. Experiments on the standard (Clark) cell have shown that impurities left in the mercurous sulphate have a considerable effect on the value of the electromotive force; it is hoped that a standard method of purification leading to consistent results will eventually be obtained; at present it is stated that the general result of the work carried out and the tests on cells submitted for standardisation show that the Clark cell cannot be regarded as a trustworthy standard. The laboratory has also under construction a standard ampere balance, and when this is completed a Lorenz machine, to be presented by the Drapers' Company, can be taken in hand. The laboratory will thus in time be in a position to give final authoritative determinations of the three fundamental electrical units.

As typifying research work of a somewhat different character, we may refer to the work which the laboratory is doing in connection with photometry. This is a subject in which the only standard we possess—the pentane lamp—is at best only a secondary standard, and one of a very unsatisfactory character. Work is being carried out in connection with the variation of this standard with the barometric pressure, and with the amount of carbonic acid and water vapour present in the air. The result of these researches may lead to a more accurate definition of the conditions for using the pentane lamp, but the laboratory also proposes to undertake experiments on some more definite standard, such as the radiation from a square centimetre of glowing platinum or from a perfectly black body at a definite temperature, which may lead to the establishment of a standard which can be regarded more as a primary standard. It is to be noted that the laboratory is using large bulb electric lamps as secondary standards, and it is probable that these will prove more satisfactory than the pentane lamp, especially as a standard which requires a chemical analysis of the atmosphere every time it is used will not be very practicable. Another research of very great practical importance, which is being carried out by Dr. Harker, is the investigation of the various methods of measuring high temperatures; an examination has already been made of the relative merits and accuracy of the different methods available for measurements up to 1100° C., the results of which have